UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 WYNKOOP ST.
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

Subject: **POLREP #11 - Progress Pollution Report**
California Gulch NPL – Leadville Mine Drainage Tunnel (LMDT)
Leadville, Lake County, Colorado

To: EPA Headquarters:
John Irizarry
Eugene Lee
EPA Region 8 OCPI: Sonya Pennock

From: Hays Griswold, On Scene Coordinator (OSC)
Craig Myers, (OSC)
8EPR-ER

Date: 6/10/2008, 1730 hrs MT

Reporting Period: 1600 Hrs MT 5/12/2008 to 1200 Hrs MT 6/10/2008

ABSTRACT

Site #:	0829	Response Authority:	CERCLA
NPL Status:	Listed	Incident Category:	Emergency Removal
CERCLIS ID #:	COD980717938	RCRIS ID#:	
Response Type:	Fund-lead	Contract #:	D.O. #:
Action Memo. Date:	3/12/08	Start Date:	02/19/2008
Removal Mob. Date:	02/22/2008	Removal Compl. Date:	TBD

1. Introduction

1.1 Background

The Leadville Mine Drainage Tunnel (LMDT) is located in west central Colorado, near the town of Leadville. The US Bureau of Mines constructed the tunnel to provide centralized drainage for portions of the extensive, interconnected mine workings in the Leadville Mining District. The Bureau of Mines contracted LMDT construction during the periods 1943-1945 and 1950-1952. When construction ceased, the LMDT extended for 11,299 feet from the portal. Ownership of the tunnel transferred to the US Bureau of

Reclamation (BOR) in December 1959. Subsequently, BOR constructed a Waste Water Treatment Plant (WWTP) near the LMDT portal to treat the tunnel effluent prior to discharge into the Arkansas River.

Since 1959, several tunnel collapses, trapping water within the tunnel, have been documented. These blockages have resulted in decreased LMDT effluent flow rates, documented differences in water elevations at various points along the tunnel alignment, and rising water levels in the retained 'mine pool'.

According to the BOR, the LMDT currently drains at the rate of approximately 1000-1100 gallons per minute (GPM). The entire volume is directed to the nearby water treatment plant where the effluent, containing elevated levels of iron, manganese, zinc, and lead, is effectively treated before discharging to the Arkansas River.

1.2 Threat Determination

Due to tunnel blockage, the LMDT is inaccessible beyond station 4+00 (400 feet in from the portal). Beyond station 4+00, the numerous collapses have caused water to back up in the main tunnel as well as the interconnected subterranean network. Accordingly, estimates range from 0.5 to 1.0 billion gallons of water currently impounded behind the various LMDT collapses. All of the impounded water is assumed to be contaminated with metals leached from the surrounding mineralized zone(s).

Due to continuing LMDT structural deterioration, the gradually-increasing hydrostatic head on water retained behind the collapses, and the increasing volume of water retained in the LMDT, there exists a potential for catastrophic release of contaminated water (a 'blowout') through the portal. In addition, newly-discovered surface seeps in the area, at elevations above the portal, indicate a rise in water level behind the plugs. The existing WWTP is incapable of treating effluent volumes anticipated during a blowout.

Private residential units have been established between the LMDT portal and the confluence with the Arkansas River. Such residential units could be directly impacted by LMDT effluent during a blowout event.

2. Current Activities

2.1 Objectives

<u>GAW Shaft</u>

Pump water from the GAW Shaft to:

- Attempt to reduce the groundwater table to affect water levels in the mine pool.
- Reduce seeps of water in California Gulch

Note: Pumping of the GAW Shaft is scheduled to continue as long as water meets water quality standards and/or until the LMDT dewatering well is operational

LMDT Dewatering Well

- Drill well at or near the 46-66 location in the tunnel and pump water from behind blockage to reduce water levels in the tunnel and decrease pressure on the blockage.
- Pump at rates compatible with the capacity of the BOR's water treatment plant.

2.2 Operations

The well drawdown test (hereafter called the pump test) was conducted from May 31st through June 3rd. The pump was ran at 500 GPM and for 4 hours, 800 GPM for two and a half hours, 1100 GPM for two hours, 1300 GPM for two hours, 1500 for two hours.. The well was allowed to recover for approximately 11 hours. A constant flow test was then performed, with the pump running at 1430 GPM for 48 hours to allow EPA to evaluate the effects of long-term pumping on the surrounding groundwater and mine pool. A total of 4,706,000 gallons pumped between both tests. Test water was captured in a temporary holding pond created for that purpose. The holding pond is performing as designed in all respects, with water slowly seeping back into the ground (which is an 80 feet thick cover of bone dry unconsolidated, unsorted, sandy, cobble, boulder glacial till that absorbs water rapidly and overlies a granite bedrock.) The pond is scheduled to be reclaimed starting this week.

EPA OSCs are developing specifications for the pumping system required for dewatering the LMDT, as well as working with BOR to design and install the structures necessary to tie the pipeline into the LMDT WTP.

The driller, Layne-Christensen, completed the well on May 22nd. The well was constructed of a 24 inch steel casing through the approximately 80 feet of glacial overburden, with a 16 inch casing extending down to approximately 7 feet above the tunnel roof. The 16 inch casing was grouted with concrete to seal the well.

ERRS crews have completed laying back slopes and setting grade along the length of the pipeline. Approximately 1500 feet of pipeline has been bedded, installed, and backfilled with an additional 3,500 feet ready to be installed. Pipe welding, bedding, and backfilling continue. Cleanouts, vents, and pressure relief valves have been and will continue to be installed to BOR's specifications. The pipeline is expected to be completed by the end of next week.

The GAW Shaft, about a mile away from the LMDT, drains via artesian flow, uncontaminated water from mine workings near, and at a higher elevation, than those connected to the LMDT. In an attempt to relieve some fraction of hydrostatic head being placed on the underground water retained by the LMDT plugs, water will be pumped

from the GAW Shaft and discharged to California Gulch (Cal Gulch), a drainage leading to the Arkansas River. GAW Shaft pumping should also reduce the volume of contaminated water being released to the environment via some of the recently-discovered surface seeps above the LMDT portal. **GAW pumping was halted on May 27th to accommodate a pump test on the new well installed at 46+96 in the LMDT. This test will assist EPA OSCs and USBOR staff in sizing a permanent pump to be installed in the well to relieve pressure behind the blockage at the Pendery fault.**

Water samples are routinely collected from the site. Water quality samples taken from the Cal Gulch area have revealed water quality levels to meet Class 1 Cold Water Aquatic Standards.

On Wednesday, February 27, 2008 at 11:00 AM an interim pump was installed in the GAW shaft and pumping operations initiated. The pump operated continuously from February 27th to March 4th, 2008, pumping approximately 150-200 GPM from the GAW Shaft into nearby Cal Gulch. On Wednesday 5 March, 2008, the existing smaller pump was disconnected and removed from the well to allow for installation of the new, custom fabricated pump designed specifically for pumping from the GAW Shaft, which has been installed. **As of 12:00 PM Tuesday, June 10th 2008 the pump is stopped for the LMDT 46+96 drawdown test and subsequent recovery. To date, over 52,771,000 gallons have been pumped from the well.**

Past Activities:

02/20/08	Leadville town meeting;
02/22/08	Remove old GAW Shaft pump;
02/25/08	EPA-BOR begin regularly scheduled technical meetings re: LMDT plugging and pumping;
02/26/08	Clear snow from the GAW Shaft portal;
02/27/08	Deliver portable generator and temporary pump to the Shaft portal;
02/27/08	GAW Shaft temporary pump operation began at 11 AM MT.
02/29/08	Installation of crushed rock roadbed in and around GAW Shaft worksite began.
03/04/08	Permanent pump and piping arrive at GAW Shaft portal.
03/04/08	EPA assigned an additional OSC, Craig Myers, to assist Lead OSC Hays Griswold.
03/05/08	Electrical installation scheduled completion.
03/06/08	New pump installed at GAW Shaft.
03/31/08	LMDT location 46-66 survey complete and drill pad under construction.
04/01/08	Survey of pipeline alignment complete
04/07/08	Award of Drilling Contract

Estimated Schedule of Future Events (Note: Schedule subject to change due to unforeseen fluctuations in field conditions)

Task	Est. Completion Date
Award Drilling Contract	**(completed)**
Mobilize Drill Rig to Site	**(completed)**
Drill and Case Hole (10-15 days)	**(completed)**
Conduct Pump Test (4 days after drilling of well is complete)	**(complete)**
Install Permanent Pump (4-10 days)	**pump will be ordered w/in the week**
Provide Power to Pump (3-4 days)	**June 30**

Installation of Pipeline to Water Treatment Plant:

Task	Est. Completion Date
Survey Pipeline Alignment:	**April 1 (completed)**
Construct and bury approx 6,000 feet of 12" HDPE Pipeline 10 feet below surface (30-40 days)	**Underway**
Terminate Pipeline at WTP (10 days)	**June 12**
Terminate Pipeline at Location 46-66 (3-4 days after pump install complete)	**(completed)**
EPA Ready to begin Pumping to WTP	**June 15**

Note: temporary pump will be used until the permanent pump is installed

2.3 Future Plans

At a public meeting held in Leadville on February 20, 2008, EPA committed to 'dewatering' the LMDT behind the collapses so as to ameliorate the threat of a LMDT catastrophic release. Such actions will include:

- Installation of a 'dewatering well' and associated pipeline.

2.4 Existing water quality data will be continually verified and/or updated.

2.5 Finance

- A Removal ceiling of $4,500,000has been authorized.

2.6 Issues

- Key issues, other than those discussed above, have not been identified at this time.

3. Participating Entities

EPA
BOR

Colorado Department of Public Health and Environment (CDPHE)
Leadville

4. Personnel on Site

4.1 EPA
4.2 BOR
4.3 CDPHE
4.4 Leadville City Employees
4.5 Lake County Employees